IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Group Art Unit: 1714

Ashish K. Khandpur, Jingjing Ma, Mark D. Gehlsen, Bradley S. Momchilovich, and John J. Stradinger

Serial No.: 09/496,831
Filed: February 2, 2000 Examiner: P. Szekely

For: Adhesive for Bonding to Low Surface Energy Surfaces

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 C.F.R. 1.8: I hereby certify that this correspondence is being sent by facsimile to the telephone number shown below, addressed to the Commissioner for Patents, Washington, D.C. 20231, on the below indicated date:

Facsimile Number: 703-872-9310

Date: January 28, 2003 By Lynelle Grube
Lynelle Grube ~~Louise M. Guggisberg~~

DECLARATION UNDER 37 C.F.R. §132 OF JINGJING MA

Commissioner for Patents
Washington, DC 20231
Box AF

JAL

I, Jingjing Ma, hereby declare that:

1. I am the same Jingjing Ma who is identified as a co-inventor in the above-identified application ("our application") and in U.S. Patent Nos. 5,393,787 ('787 Patent) and 5,773,506 ('506 Patent).

2. I received a Bachelor of Materials Science degree from the Northwest Polytechnic University in Xian, China in 1976; a Master of Science degree in Polymer Science from the Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China in 1981; and a Ph.D. degree in Polymer Science from the University of Akron in Akron, Ohio in 1991.

3. From 1990 to the present I have been employed by Minnesota Mining and Manufacturing Company (3M) in St. Paul, Minnesota, in the Adhesive Technologies Center (from 1990 to 1998) and in the Industrial Tape and Specialties Division (from 1998 to the

present), where I work on block copolymer synthesis, adhesive formulation, and tape product development and commercialization. My current title is Senior Research Specialist.

4. I am an inventor or co-inventor of 7 issued U. S. patents, 8 pending U.S. patent applications and one pending U.S. provisional application involving adhesives and adhesive products.

5. I have read the Final Rejection mailed May 6, 2002, the cited `787 Patent and `506 Patent and our application. Our application describes adhesives having particularly good bond strength on low surface energy surfaces. The adhesives contain a polymodal asymmetric elastomeric block copolymer and at least one tackifier or tackifying resin. The tackifier or tackifying resin is present in an amount sufficient to raise the calculated Fox Tg of the adhesive's rubber phase to greater than 245°K. A 5 mil thick film of the adhesive can exhibit a 180° peel strength on high density polyethylene ("HDPE") of at least about 60 N/dm.

6. The adhesives of the `787 Patent and the adhesives of our application are not the same. The `787 patent exemplifies five block copolymers, three of which (Polymer A, Polymer B and Polymer C, see Table 2) are asymmetric. These were made into adhesives as shown in Table 3 of the `787 Patent. The accompanying Declaration from my colleague and coinventor Dr. Ashish Khandpur shows that the adhesives made from Polymer A, Polymer B and Polymer C in the `787 Patent had calculated rubber phase Fox Tg values of 240.2 to 240.5°K. These rubber phase Fox Tg values are not "greater than 245°K".

7. The adhesives of the `787 Patent provide moderate adhesion, good resistance to low stress peel forces and easy, clean removability, as evaluated on stainless steel panels (see e.g., col. 1, lines 44-46, col. 8, lines 41-62 and col. 9, lines 44-51). The adhesives of the `787 Patent were not designed to provide a high strength bond to low surface energy surfaces. An adhesive that provided a high strength bond on a low surface energy surface such as HDPE would ordinarily provide an even higher strength bond on stainless steel. In my opinion such an adhesive would not be expected to satisfy the `787 Patent's moderate adhesion and easy removability goals.

8. To further illustrate the differences between our application and the `787 Patent, I recently gave Dr. Khandpur a sample of the polymodal asymmetric elastomeric block copolymer (the "Base Copolymer") employed in the examples and comparative examples in our application (see page 20, lines 1-13). It was prepared like Polymer B of the

'787 Patent, with somewhat higher molecular weight endblocks and an otherwise generally similar molecular structure. The Base Copolymer should provide adhesion to a low surface energy surface that would be comparable (at equivalent tackifier levels) to the adhesion that might be provided by an adhesive containing Polymer A, Polymer B or Polymer C of the '787 Patent. At Dr. Khandpur's request, our colleague and coinventor John J. Stradinger (a technologist who works with Dr. Khandpur) formulated the Base Copolymer into an adhesive containing sufficient ESCOREZ™ 1310 hydrocarbon aliphatic tackifier and ZONAREZ™ A-25 poly alpha-pinene resin so that the calculated Fox Tg of the adhesive's rubber phase would be 243.3°K. This is a higher rubber phase Fox Tg than was employed in the adhesives exemplified in the '787 Patent, and is not an adhesive shown or suggested in the '787 Patent. It is merely being discussed here to address a request from Examiner Michl for comparative data for an adhesive like that of the '787 Patent but having a Tg near 245°K. The 180° peel adhesion results that Mr. Stradinger obtained are described in Dr. Khandpur's accompanying Declaration, and show that the thus-formulated adhesive exhibited a 180° peel adhesion value of 50.1 N/dm on HDPE.

9. The adhesives of the '506 Patent and the adhesives of our application are not the same. The '506 Patent exemplifies six block copolymers, one of which (Polymer F) is asymmetric. As shown in Table 6 of the '506 Patent, Polymer F was made into Adhesive 11 and Adhesive 12. Dr. Khandpur's Declaration shows that Adhesive 11 and Adhesive 12 had a recalculated rubber phase Fox Tg of 243.2°K. This rubber phase Fox Tg value is not "greater than 245°K".

10. The adhesives of the '506 Patent are designed for uses such as removable tapes, low unwind noise tapes, tapes for use in cold environments, masking tapes, packaging tapes, medical tapes, autoclave indicator tapes, labels, facestock and protective sheeting (see e.g., col. 1, lines 36-55 and col. 6, lines 62-67), these being applications that typically rely on a balance of properties including moderate adhesion, good resistance to low stress peel forces and easy, clean removability.

11. To further illustrate the differences between our application and the '506 Patent, I recently gave Dr. Khandpur a sample copolymer ("Substitute Polymer F") for formulation into an adhesive. I did not provide a sample of Polymer F itself as my supply had been used up or discarded. Polymer F and Substitute Polymer F have the following characteristics:

Sample	Calculated Formula	Mn (g/mole) S1	S2	I	%High MW Arm	Styrene, Wt.%
Polymer F	(S22-I98).24-Y-(I98-S5).76	5,400	21,600	98,000	24	8.7
Substitute Polymer F	(S20-I90).30-Y-(I90-S5).70	5,100	19,600	90,000	29	9.1

In my opinion these copolymers are sufficiently similar that the use of Substitute Polymer F in place of Polymer F in an adhesive would provide experimental results within the range of experimental results that might be expected had I instead resynthesized Polymer F and used it in an adhesive.

12. As shown in Dr. Khandpur's Declaration, Mr. Stradinger formulated Substitute Polymer F into an adhesive containing sufficient ESCOREZ 1310 and ZONAREZ A-25 (as used in Adhesive 11 of the '506 Patent) so that the calculated Fox Tg of the adhesive's rubber phase was 243.3°K. The 180° peel adhesion results that Mr. Stradinger obtained are also described in Dr. Khandpur's Declaration, and show that the formulated adhesive exhibited a 180° peel adhesion value of 30.2 N/dm on HDPE.

13. Comparison of the data in our application to the above-described experimental results shows that the adhesives of our application provide better 180° peel strength on HDPE (*viz.*, at least about 60 N/dm) than an adhesive based on a copolymer like one shown in the '787 Patent or an adhesive based on a copolymer like one shown in the '506 Patent when such copolymers are combined with sufficient tackifier to raise the calculated rubber phase Fox Tg of the resulting adhesives to 243.3°K.

14. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

Further Declarant saith not.

08/08/2002
Date

Jingjing Ma